Animal Biotechnology

Course Description: This course is to prepare students with interests in higher-level, science-based animal agriculture. Students will study rigorous standards related to taxonomy, anatomy and physiology, body systems, reproduction, hormonal and immune systems, nutrition, heredity and genetics (molecular biology), health, agrimedicine, well-being, DNA and biotechnology, and emerging technologies associated with companion and production animals.

Recommended Prerequisites: Agriscience, Introduction to Agricultural Sciences or Introduction to Horticultural Sciences and Biology

Recommended Credit: 1

Recommended Grade Level: 11th or 12th

Course Codes:** A10 – **5136** or A12 - **5186**

** Use A12 Course Code number for all programs. A10 should be used for 10 month programs only.

Animal Biotechnology

Standard 1.0

Evaluate the importance of animal biotechnology in agriculture and our society.

Standard 2.0

Assess the importance of safety practices in animal biotechnology and classroom laboratories.

Standard 3.0

Investigate entry level and advancement opportunities in animal biotechnology careers.

Standard 4.0

Assess the importance of the ethical issues related to animal biotechnology.

Standard 5.0

Evaluate the process to conduct experiments and research in animal biotechnology.

Standard 6.0

Evaluate animal genetics and heritability in relation to animal science and biotechnology.

Standard 7.0

Explain animal biotechnology concepts related to agrimedicine and "pharming."

Standard 8.0

Demonstrate premier leadership and personal growth needed for careers in animal biotechnology.

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Standard 1.0

Evaluate the importance of animal biotechnology in agriculture and our society.

Learning Expectations and Performance Indicators:

1.1 Summarize the important historical achievements in biotechnology.
1.2 Determine the importance of biotechnology to the economy.
1.3 Distinguish the areas of science that are a part of animal biotechnology.
1.4 Identify ways in which biotechnology affects our everyday lives.

Standard 2.0

Assess the importance of safety practices in plant biotechnology and classroom laboratories.

Learning Expectations and Performance Indicators:

2.1 Demonstrate safe practices in the biotechnology laboratory.
2.2 Complete a biotechnology and classroom laboratory safety test with 100 percent accuracy.
2.3 Demonstrate the use of terminology associated with laboratory and biological safety when writing lab reports.
2.4 Discuss the meaning and importance of safety and safe work in animal biotechnology.
2.5 Evaluate the hazards in animal biotechnology.
2.6 Compare zoonotic diseases and prevention measures associated with handling and care of animals.
2.7 Examine the importance in personal safety in animal biotechnology.
2.8 Demonstrate procedures for achieving and maintaining aseptic conditions during biotechnology laboratories.
2.9 Demonstrate the use of common biotechnology laboratory equipment.

Standard 3.0

Investigate entry level and advancement opportunities in animal biotechnology careers.

Learning Expectations and Performance Indicators:

3.1 Identify career opportunities in animal biotechnology area.

3.2 Determine employment demand and location for animal biotechnology careers.

3.3 Discuss the type of technical and personal skills required for animal biotechnology careers.

3.4 Research and prepare a written report on career opportunities in animal biotechnology.

Standard 4.0

Assess the importance of the ethical issues related to animal biotechnology.

Learning Expectations and Performance Indicators:

4.1 Debate ethical and practical issues surrounding biotechnology.

4.2 Assess regulatory organizations and issues concerning genetically modified organisms.

4.3 Examine ethical issues concerning the use of genetic manipulation to improve the agricultural productivity of living organisms.

4.4 Critique ethical issues arising from the use of biotechnology and genetic engineering techniques in human health care.

Standard 5.0

Evaluate the process to conduct experiments and research in animal biotechnology.

Learning Expectations and Performance Indicators:

5.1 Summarize terminology related to the scientific method and experimentation in animal biotechnology.

5.2 Examine procedures in conducting experimental research.

5.3 Examine how the research process is applied to lab and field experiments.

5.4 Assess the process of collecting data for experimentation.

5.5 Evaluate the differences between findings, conclusions and recommendations.

5.6 Examine the components and preparation of a research report.

5.7 Conduct experiments using the applications of the scientific research process and prepare a written research report.

Standard 6.0

Evaluate animal genetics and heritability in relation to animal science and biotechnology.

Learning Expectations and Performance Indicators:

6.1 Demonstrate the correct use of terminology associated with animal genetics and heritability.
6.2 Examine the role and importance of genetics and heritability in animal biotechnology.
6.3 Illustrate the importance of various animal breeding methods.
6.4 Examine how genetic principles are used to improve agricultural production.
6.5 Identify animal that reflect dominant and recessive traits.
6.6 Investigate how dominant and recessive genes affect animal characteristics.
6.7 Conduct research to determine how selective breeding influences phenotype and prepare a written report.
6.8 Investigate positive and negative aspects of various biotechnology methods in relation to animal reproduction.
6.9 Investigate the use of cloning to have desired qualities that may not result through genetics.

Standard 7.0

Explain animal biotechnology concepts related to agrimedicine and "pharming."

Learning Expectations and Performance Indicators:

7.1 Define vocabulary related to agrimedicine and biotechnology.
7.2 Outline biomedical applications of agricultural products and processes.
7.3 Discuss the practice of "pharming" and the creation of genetically altered organisms to produce medical substances.
7.4 Conduct a basic experiment in the area of agrimedicine and prepare a written report.

Standard 8.0

Demonstrate premier leadership and personal growth needed for careers in animal biotechnology.

Learning Expectations and Performance Indicators:

8.1 Demonstrate public speaking abilities through oral presentations and participating in career development events.
8.2 Recommend supervised agricultural experience program (SAEP) project that relates to plant biotechnology.
8.3 Demonstrate public relations and citizenship skills necessary to be productive in plant biotechnology careers.
8.4 Demonstrate work ethics and team building skills used in industry today.